

**PROJECTOR AND CAMERA ARRANGEMENT WITH SHARED OPTICS AND  
OPTICAL MARKER FOR USE WITH WHITEBOARD SYSTEMS**

**Abstract of the Disclosure**

5       Projector and camera arrangements are provided for use in electronic whiteboard  
systems. Specifically, the present invention provides projector and camera arrangements  
wherein the projector and camera share the same imaging optics. By sharing the same  
projection and camera optics, the distortions that affect the projection system are the same  
as those of the camera system. Thus, the calibration step required in conventional  
whiteboard systems where the projector and camera are separate, i.e., each having their  
10       own distinct optics and settings, is no longer needed. Further, the arrangements provided  
in accordance with the invention are self-aligning, even when lens distortions are large  
and even in the presence of strong perspective effects. The shared optics projector and  
camera arrangements of the invention also provide for dynamic zooming. In addition,  
various active and passive optical marker or lightpen designs are provided for use in  
15       electronic whiteboard systems.

1500-131.APP